

### Claims

5 1. A barrier coating composition comprising a liquid crystalline polymer, characterized in that the liquid crystalline polymer is formed in that a polymerizable liquid crystalline mixture comprising one or more polymerizable mesogenic compounds is first applied onto a substrate and polymerized afterwards.

10 2. A barrier coating composition as claimed in claim 1, characterized in that the polymerizable mesogenic compounds of the polymerizable liquid crystalline mixture are selected of formula I

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$$P-(Sp-X)_n-MG-R \quad I$$

wherein

20 P is a polymerizable group,

Sp is a spacer group having 1 to 25 C atoms,

25 X is -O-, -S-, -CO-, -COO-, -OCO-, -CO-NH-, -NH-CO-,  
-CH<sub>2</sub>CH<sub>2</sub>-, -OCH<sub>2</sub>-, -CH<sub>2</sub>O-, -SCH<sub>2</sub>-, -CH<sub>2</sub>S-, -CH=CH-,  
-CH=CH-COO-, -OCO-CH=CH-, -C≡C- or a single bond,

n is 0 or 1,

30 MG is a mesogenic group, and

35 R is H, CN, NO<sub>2</sub>, halogen or a straight-chain or branched alkyl radical with up to 25 C atoms which may be unsubstituted, mono- or polysubstituted by halogen or CN, it being also possible for one or more non-adjacent CH<sub>2</sub> groups to be replaced, in each case independently from one another, by -O-, -S-, -NH-, -N(CH<sub>3</sub>)-, -CO-, -COO-, -OCO-, -OCO-O-,

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-S-CO-, -CO-S- or -C≡C-, in such a manner that oxygen atoms are not linked directly to one another, or alternatively R is denoting P-(Sp-X)<sub>n</sub>.

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3. A barrier coating composition as claimed in claim 2, characterized in that MG in formula I is selected of formula II



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wherein

Z<sup>1</sup> and Z<sup>2</sup> are each independently -COO-, -OCO-, -CH<sub>2</sub>CH<sub>2</sub>-,  
-OCH<sub>2</sub>-, -CH<sub>2</sub>O-, -CH=CH-, -CH=CH-COO-, -OCO-CH=CH-,  
-C≡C- or a single bond,

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A<sup>1</sup>, A<sup>2</sup> and A<sup>3</sup> are each independently 1,4-phenylene in which, in addition, one or more CH groups may be replaced by N, 1,4-cyclohexylene in which, in addition, one or two non-adjacent CH<sub>2</sub> groups may be replaced by O and/or S, 1,4-cyclohexenylene, 1,4-bicyclo(2,2,2)octylene, piperidine-1,4-diyl, naphthalene-2,6-diyl, decahydronaphthalene-2,6-diyl or 1,2,3,4-tetrahydronaphthalene-2,6-diyl, it being possible for all these groups to be unsubstituted, mono- or polysubstituted with F, Cl, OH, CN, NO<sub>2</sub> or alkyl, alkoxy or alkanoyl groups having 1 to 7 C atoms wherein one or more H atoms may be substituted by F or Cl, and

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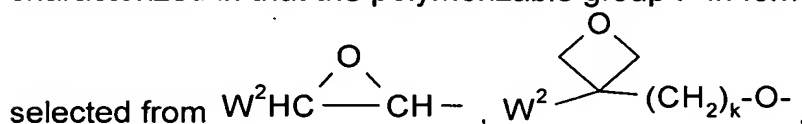
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m is 0, 1 or 2.

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4. A barrier coating composition as claimed in claims 2 or 3, characterized in that the polymerizable group P in formula I is

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$\text{CH}_2=\text{CW}^1\text{-COO-}$ ,  $\text{CH}_2=\text{CW}^2\text{-O-}$ ,  $\text{CH}_3\text{-CH=CH-O-}$ ,  $\text{HO-CW}^2\text{W}^3\text{-}$ ,  
 $\text{HS-CW}^2\text{W}^3\text{-}$ ,  $\text{HW}^2\text{N-}$ ,  $\text{HO-CW}^2\text{W}^3\text{-NH-}$ ,  $\text{CH}_2=\text{CW}^1\text{-CO-NH-}$ ,  
 $\text{CH}_2=\text{CH-(COO)}_{k1}\text{-Phe-(O)}_{k2}\text{-}$ ,  $\text{Phe-CH=CH-}$ ,  $\text{HOOC-}$ ,  $\text{OCN-}$  and  
 $\text{W}^4\text{W}^5\text{W}^6\text{Si-}$ , with  $\text{W}^1$  being H, Cl, CN, phenyl or alkyl with 1 to 5 C-  
 5 atoms,  $\text{W}^2$  and  $\text{W}^3$  being independently of each other H or alkyl with  
 1 to 5 C-atoms,  $\text{W}^4$ ,  $\text{W}^5$  and  $\text{W}^6$  being independently of each other Cl,  
 oxaalkyl or oxacarbonylalkyl with 1 to 5 C-atoms, Phe being 1,4-  
 phenylene, k is an integer from 1 to 12 and  $k_1$  and  $k_2$  being  
 10 independently of each other 0 or 1.

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5. A barrier coating composition as claimed in at least one of claims 2, 3  
 and 4, characterized in that the spacer group Sp is a linear or  
 branched alkylene group having 1 to 20 C atoms, in which, in  
 15 addition, one or more non-adjacent  $\text{CH}_2$  groups may be replaced by  
 $\text{-O-}$ ,  $\text{-S-}$ ,  $\text{-NH-}$ ,  $\text{-N(CH}_3\text{)-}$ ,  $\text{-CO-}$ ,  $\text{-O-CO-}$ ,  $\text{-S-CO-}$ ,  $\text{-O-COO-}$ ,  $\text{-CO-S-}$ ,  
 $\text{-CO-O-}$ ,  $\text{-CH(halogen)-}$ ,  $\text{-CH(CN)-}$ ,  $\text{-CH=CH-}$  or  $\text{-C}\equiv\text{C-}$ .

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20 6. A barrier coating composition as claimed in at least one of claims 2 to  
 5, characterized in that R in formula I denotes  $\text{P-(Sp-X)}_n\text{-}$ .

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25 7. A barrier coating composition as claimed in at least one of claims 2 to  
 6, characterized in that the polymerizable liquid crystalline mixture  
 comprises at least one polymerizable mesogenic compound having  
 one polymerizable functional group and at least one polymerizable  
 mesogenic compound having two or more polymerizable functional  
 groups.

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8. A method for the preparation of a barrier coating composition as  
 claimed in at least one of the preceding claims, characterized in that  
 a) a polymerizable liquid crystalline mixture comprising one or more  
 35 polymerisable mesogenic compounds is applied onto a substrate,

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- b) the polymerizable liquid crystalline mixture is aligned into a uniform orientation, and  
c) the polymerizable liquid crystalline mixture applied and aligned onto the substrate is polymerized to give a liquid crystalline polymer and to permanently fix the orientation of the liquid crystalline mixture.
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9. The use of a barrier coating composition as claimed in at least one of claims 1 to 7 in barrier coating layers of Organic Field effect transistors, Liquid crystal displays, OLED displays, flexible displays, displays of TV screens, photovoltaic cells and lithium batteries.
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10. The use of a barrier coating composition as claimed in at least one of claims 1 to 7 in barrier coating layers of food and medical packagings.
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11. A device comprising a barrier coating layer, characterized in that this layer comprises a barrier coating composition as claimed in at least one of claims 1 to 7.
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12. A display comprising a barrier coating layer, characterized in that this layer comprises a barrier coating composition as claimed in at least one of claims 1 to 7.
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13. Food packaging having a barrier coating layer, characterized in that this layer comprises a barrier coating composition as claimed in at least one of claims 1 to 7.
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14. Medical packaging having a barrier coating layer, characterized in that this layer comprises a barrier coating composition as claimed in at least one of claims 1 to 7.
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